



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

August 24, 2016

PC Code: 129121

DP Barcode: 432832 and ~~314145~~
431145

MEMORANDUM

SUBJECT: **Fipronil:** Section 3 ecological risk and drinking water assessment for use of fipronil in bait stations for the control of yellow jackets (*Vespula spp.*)

FROM: Edward Odenkirchen, Ph.D., Senior Advisor *E.O. Odenkirchen*
Immediate Office
Environmental Fate and Effects Division (7507P)

THRU: Sujatha Sankula, Ph.D. Chief *for Sujatha, Greg Orlich 8-24-16*
Environmental Risk Branch 1
Environmental Fate and Effects Division (7507P)

TO: Timothy Ciarlo, Risk Manager Reviewer
Kable Davis, Risk Manager
Marietta Echeverria, Chief
Invertebrate-Vertebrate Branch 1
Registration Division (7505P)

The Registration Division (RD) requested the Environmental Fate and Effects Division (EFED) to conduct an ecological risk and drinking water assessment to support a FIFRA Section 3 regulatory decision concerning the use of fipronil (MGK Formulas 3115 and 2993 and 2-Star Solution's Yellow-Jacket Nest Killer) for the control of yellow jackets.

Description of Use

The referenced products are packaged as bait stations (bait station structure, fipronil solution, and bait material) or in the case of MGK Formula 2993 either as aforementioned or as a product containing fipronil solution and bait material along with instruction to make a bait station. The bait material is meat based and is said to be attractive to yellow jackets but not honeybees according to the MGK Formula 2993 and 3115 labels (the Yellow-Jacket Nest Killer label does not mention attractiveness to honeybees). The bait boxes are either small flexible plastic structures or home-made devices, neither of which are certified pet proof. While the labels mention deploying the stations from strings or wires attached to tree limbs, stakes, fence posts, or poles, there is no requirement that they be deployed in a manner where scavenging wildlife cannot access them.

The labels include the following application instructions (*paraphrased*):

1. Application rate:

Formulas 3115 and 2993:

Max 15 grams of treated bait per acre of treatment area at any one time

$15 \text{ (g bait/acre)} * 0.001 \text{ (g fipronil/g bait)} = \mathbf{15 \text{ mg fipronil/acre}}$

Yellow-Jacket Nest Killer:

Four bait stations /10,000 ft²

Entire contents of fipronil solution for four bait stations is 0.3 ml

$0.3 \text{ ml solution} * 1 \text{ g/ml (assumed density)} * 0.091 \text{ (g fipronil/g solution)} = 27.3 \text{ mg fipronil}$

$27.3 \text{ mg fipronil} / 10,000 \text{ ft}^2 * 43,560 \text{ ft}^2/\text{acre} = \mathbf{119 \text{ mg fipronil/acre}}$

(NOTE: the language on Yellow-Jacket Nest Killer proposed label is not clear that 4 stations per 10,000 ft² is the maximum. For this risk assessment to be valid, modifications to the label to this effect must be in place.)

2. Reapplication Interval:

Formulas 3115 and 2993:

The labels instruct user to repeat application of bait to stations when the bait is completely removed or after 3-4 days if yellow jackets are still present. The formula 2993 label also states that control should be achieved within two to three days if stations are effectively placed. However, the labels are silent regarding the number of repeated package placements in a given year.

Yellow-Jacket Nest Killer:

The label indicates that the entire contents of a single package (containing 4 bait stations and a 0.3 ml solution of fipronil) would be used over approximately five days. However, the label is silent regarding the number of repeated package placements in a given year.

(NOTE: for the purposes of this risk assessment the use of the total package contents is assumed to be used on an acre, once per year. The labels on all products should be clarified in this regard in order for this risk assessment to be valid. An E-mail outlining this label issue was submitted to RD on March 31, 2015 yet no change to the label was submitted in response.)

Conceptual Model for Risk Assessment

In an email to RD dated March 31, 2015 EFED reviewers outlined the approach to the initially reviewed labels for these products as they relate to the assumptions of complete exposure pathways to non-target receptors. The email placed these labels in comparison with the situation encountered in a previous experimental Use Permit of the baits in Hawaii, comparing and contrasting the expected conditions of use and the attendant exposure pathways considered to be

complete. Because nothing on the labels has significantly changed regarding the description of allowable use the conceptual model is still valid and is captured from that document below:

EFED previously evaluated this use in connection with an experimental use permit for fipronil to control western yellow jackets in Hawaii Volcanoes National Park. That review made a finding of no complete exposure pathways for non-target terrestrial invertebrates. In this previous action, contaminated /eradicated insect nests were to be excavated and removed, preventing materials from entering surface and ground water and from entering terrestrial vertebrate food chains.

In contrast, under the new use, there is no provision for yellow jacket nest removal. Consequently, there are potential complete exposure pathways to surface and ground waters and to terrestrial vertebrates consuming the remains of yellow jacket nests. The available information accompanying the application also indicates that, though infrequent, non-target terrestrial invertebrates can gain access to the bait station contents.

EFED expects that a risk assessment supporting Section 3 registration will assess these complete exposure pathways for risks to non-target aquatic and terrestrial organisms.

In addition to the consumption of contaminated yellow jacket nest contents, the presence of meat-based bait raises the concern on the mainland of the United States that omnivorous, scavenging, and predatory mammalian wildlife (such native wildlife is lacking in Hawaii and was not identified as an issue there) could seek out the bait stations, attracted by the smell of the bait. A sufficiently large mammal (e.g. opossum, raccoon, or fox) could easily gain access to the bait box contents as the boxes are not certified pet proof. It is not likely that birds would be attracted to the meat bait in a similar manner as mammals and the baits are very small so no large scent source to attract large bird scavengers and in a bait enclosure so no visual queue for other avian scavengers.

Risks to Aquatic Organisms

For aquatic risk assessment a conservative exposure assumption is that the entire amount of fipronil material is collected by yellow jackets on an acre of land and from the entirety of packages of bait material used to treat an acre of land is left available for runoff from an eroded dead Yellow jacket nest. Owing to the slow kill nature of fipronil, it is likely that a Yellowjacket nest will accumulate pesticide in excess of the amount needed to destroy a nest. This simple point source of collected material would be very conservative and maximally result in the following loadings:

Formulas 3115 and 2993: 15 mg fipronil/acre or 0.000033 lb/acre (0.000037 kg/ha)

Yellow-Jacket Nest Killer: 119 mg fipronil/acre or 0.00026 lb/acre (0.00029 kg/ha)

Assuming the toxicity profile and fate profile for fipronil and degradates has remained unchanged since the 2007 RED, the risk assessment findings from the RED would be useful as a comparison of the yellow jacket application to the risks estimated for application of fipronil in other residential/turf scenarios at similar loadings. The 2007 RED reports that no aquatic risk concerns for the broadcast fire ant residential use HG 61743AE (i.e., no RQs equal to or exceeding Agency levels of concern) at a rate of 0.002 kg/ha (0.0022 lb/acre or 7 to 54 times greater than the assumed rates for the proposed new use).

Because the effective maximal and highly conservative application rates of the two yellow jacket products are below that modelled for broadcast fire ant residential use of HG 61743AE, it is reasonable to predict no aquatic organism concerns for these products.

Risks Terrestrial Organisms

Mammals

Because the bait stations contain meat product, it is possible that a sufficiently large mammal (e.g. opossum, raccoon, and fox) may be attracted to the stations, and if not elevated sufficiently off the ground, the stations may be accessed by these organisms. In addition, a sufficiently large mammal may also consume the bait fipronil in an excavated dead Yellow jacket nest. EFED has limited the assessment to parent fipronil as the material in the bait packages is shielded from the elements, and the contents of killed Yellowjacket nests would be highly labile and likely only attractive for a brief period; thereby limiting the extent to which the fipronil in either the station or nest would convert to degradates. In either case the conservative maximum amount of bait available over an acre at any given time would be:

Formulas 3115 and 2993: 15 mg fipronil/acre

Yellow Jacket Nest Killer: 119 mg fipronil/acre

Conservatively assuming that amount is consumed by a 1000 g mammal, a reasonable sized organism (e.g. opossum, raccoon, or fox) that might break open bait stations or excavated a dead insect nest, the exposure maximally could be:

Formulas 3115 and 2993: 15 mg fipronil/1000 g-bw or 15 mg/kg-bw

Yellow Jacket Nest Killer: 119 mg fipronil/1000 g-bw or 119 mg/kg-bw

The 2007 RED reports an acute lethal endpoint of 74.61 mg/kg-bw for fipronil for a 1000 g mammal. Comparing this endpoint to the maximal exposures would result in the following acute risk quotients:

Formulas 3115 and 2993: $15 \text{ mg/kg-bw} / 74.69 \text{ mg/kg-bw} = 0.20$

Yellow-Jacket Nest Killer: $119 \text{ mg/kg-bw} / 74.69 \text{ mg/kg-bw} = 1.6$

The acute RQ values above both exceed the acute level of concern (LOC 0.1) for Federally listed mammals. Only the Yellow Jacket Nest Killer acute RQ exceeds the non-listed mammal LOC (0.5). To further characterize the acute risk picture for Formulas 3115 and

2993, consumption of the content of a minimum of five bait stations is sufficient to raise potential listed species concerns, should exposure actually occur. For the Yellow Jacket Nest Killer, the consumption of three bait boxes or a third of the package contents would still trigger acute non-listed mammal concerns and consumption of even one station would exceed the potential for concerns for listed mammals.

The 2007 RED reports a chronic reproduction effects threshold of 2.03 mg/kg-bw for a 1000g mammal. Comparing this endpoint to the maximal exposures would result in the following chronic risk quotients:

Formulas 3115 and 2993: $15 \text{ mg/kg-bw} / 2.03 \text{ mg/kg-bw} = 7.4$

Yellow Jacket Nest Killer: $119 \text{ mg/kg-bw} / 2.03 \text{ mg/kg-bw} = 58.6$

Both products' chronic RQs exceed the listed and non-listed mammal chronic LOC (1.0). Even taking an assumption of lesser accessing efficiency of bait stations, for example only one station (<10% of the total rate per acre as yellow Jacket Nest Killer is applied at a rate of 4 stations per 10,000 ft²) would still exceed the chronic level of concern for Yellow Jacket Nest killer product..

Birds

It is not expected that birds will consume the bait directly owing to the use in a confined bait station. Birds might feed incidentally on yellow jackets transporting the bait back to the subterranean nest. Taking a conservative assumption that such feeding would result in exposures similar to broadcast outdoor application of fipronil it is possible to approximate risk by comparison to those modelled in the 2007 RED risk assessment. The RED concluded that a use of Over'N Out broadcast at 0.01 kg/ha (0.009 lb/acre), assuming 100 percent availability of material, did not trigger avian risk concerns. **Because the effective maximal and highly conservative application rates of the two yellow jacket products are 1-2 orders of magnitude below that modelled for broadcast of Over'N Out, it is reasonable to predict no avian concerns for these products.**

Plants

EFED does not consider terrestrial plants to be at risk of direct exposure to the yellow jacket bait materials. They are confined to bait stations until the target insects transport the material to a subterranean nest. **The opportunity for plant exposure is assumed negligible, and therefore risk to plants is not of concern.**

Terrestrial Invertebrates

While EFED does not consider exposure or risks of concern likely for honeybees, the attractiveness of the material for other insects (e.g. carrion flies and carrion beetles) cannot be ruled out and so risks to these organisms cannot be precluded.

Drinking Water Assessment

The proposed application rates (Formulas 3115 and 2993: 0.000037 kg/ha and Yellow Jacket Nest Killer: 0.00029 kg/ha) are orders of magnitude lower than the application rates (range = 0.0032 to 0.1456 kg/ha or 0.00358 to 0.1632 lb/acre) evaluated in the previous drinking water assessment (DWA) conducted at the time of the RED (USEPA 2006; D322415+). **Because the application rates are 1-3 orders of magnitude lower than currently registered uses, it is the Agency's opinion that a DWA for these proposed uses is not needed at this time.**

Overall Risk Conclusions

EFED concludes the following regarding non-target organism risks and drinking water:

All Aquatic organisms:	No risks of concern
Terrestria plants:	No risks of concern
Birds:	No risks of concern
Terrestrial Invertebrates:	Honeybees not of concern because the baits are un-attractive. It is presumed that other terrestrial invertebrates responding to a meat-based bait (eg. carrion flies and beetles) may be attracted and intoxicated by the products.
Mammals:	Acute and chronic risk concerns through consumption of either bait taken from non-pet certified bait stations or from material scavenged from killed target organism nests. The lethal risk concerns are less likely as multiple bait stations must be scavenged to reach a concern level. However, the reproduction effect associated chronic concerns are potentially more confident, especially for the Yellow-Jacket Net Killer may be enough to trigger a concern.
Drinking Water:	Available Drinking water estimates provided by previous evaluations are conservatively representative of this use and no new estimate specific for this use is needed at this time.

References

- USEPA. 2006. Revision of in Response to Registrant Comments on Comparative Drinking Water Assessment for Proposed and Registered Fipronil Uses. Office of Pesticides Programs. June 26, 2006. (DP 322415, 319940, and 328892)
- USEPA. 2007. Ecological Risk Assessment for Fipronil Uses. Office of Pesticides Programs. February 6, 2007. (DP 331595, 331519, 331593, 329522, 314530, 332424, 325983, 326009, 326000, 325999, 325997, 325990, 326003, 331867, 314530, 322414, 314197, 331714, 331713, 313295, 331872, and 335805)